Effect of stage of maturity at harvest and chop length on faecal particle size in dairy cows fed grass silage

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Effect of organic minerals in dry cow and lactating diets on health and fertility in Jersey cows

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Research carried out examining the inclusion of organic forms of trace minerals noted beneficial effects on dairy cow health and production. This trial was set up to evaluate effects of replacement of inorganic minerals with organic forms on health and fertility in a commercial, UK dairy herd. Pedigree Jersey cows (n=207) were fed a basal TMR plus minerals (inc. Cu 600; Mn 800; Zn 1800; Se 8 mg/d) from 1st April 08 - 31st March 09. Dry cows were fed the basal TMR plus wheat straw, dry cow minerals (inc. Cu 300; Mn 400; Zn 700; Se 7 mg/d). Animals were housed in cubicle sheds until 100-120d post-calving then moved to straw sheds. From 1st August 08, minerals were reformulated to totally replace inorganic Mn, Zn and Se and partially replace inorganic Cu in both lactation (Cu 600; Mn 150; Zn 600; Se 6 mg/d) and the dry period (Cu 300; Mn 100; Zn 400; Se 5 mg/d) with the respective organic form (Bioplex®, Alltech Inc., KY) for Cu, Zn and Mn. Inorganic Se was replaced by selenised yeast (Sel-Plex®, Alltech Inc., KY). Vitamin E remained constant at 1000IU/d. Incidence of mastitis, somatic cell count (SCC), days to 1st service and services per conception were measured during the trial. Data were analysed using ANOVA. Use of organic Zn, Mn, Se and Cu resulted in fewer ($P<0.05$) cases of mastitis based on month of calving and fewer ($P<0.05$) cases as a percentage of cows calved each month. There was no effect on herd average SCC or number of animals with high SCC (>400, 000). Days to 1st service were reduced ($P<0.05$) from 72 to 64 for cows receiving organic vs. inorganic minerals. Compared with the herd average, services per conception were numerically reduced from 2.01 to 1.37 for animals calving September 08 - February 09. These data demonstrate the benefits of organic mineral supplementation during both the dry period and lactation and support the growing trend towards nutrient management where bioavailabilty is of greater concern than total supply.

The effects of different silage additives on *in vitro* gas production, digestibility and energy values of sugar beet pulp silage

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The aim of this study was to investigate the effects of different silage additives during ensiling on silage quality, gas production, gas production parameters, energy values, organic matter digestibility and dry matter digestibility of sugar beet pulp silage (SBPS). A total of eight different silages were prepared from sugar beet pulp. Silage additive treatments were no additives (Control; CONT), the Artturi Imarin Virtanen (AIV;1 part H_2SO_4, 1 part HCl and 6 part water; 80 g/kg); urea (UREA; 1% of fresh weight material); formic acid (FAS; 2.2-2.5 lt/ton), microbial inoculants which were obtained from Alltech-Pioneer Maize All (MAL; 10 g/t) and Sil All (SAL; 10 g/t); F silofarm sodium formiat dry (SFD; 0.5 kg/ton) and F silofarm liquid (formic acid, sodium format and water; SLI 5-7 kg/ton). The effects of different silage additives were determined using chemical composition, cellulase method and *in vitro* gas production technique. Gas production of the silages was determined at 0, 3, 6, 9, 12, 24, 48, 72 and 96 h incubation times and their gas production kinetics were described using the equation $y = a + b\ (1\text{-}e^{-ct})$. The silage additives significantly influenced the nutrient composition of SBPS ($P<0.01$). The highest crude protein content was found in UREA added SBPS. AIV treatment resulted in the lowest *in vitro* gas production values at 24, 48, 72 and 96 h of fermentation and the values of AIV treatment were significantly different from those of other treatments ($P<0.01$). Highest energy values and gas productions were observed for MAL, SAL, SLI and SFD. The use of *in vitro* gas production technique can be recommended for the estimation of metabolisable energy and net energy lactation values of SBPS since this technique provides more reliable estimates as compared to cellulase method. In conclusion, suitable additive should be selected with the consideration of the rate and amount of roughage and concentrate feeds offered to animals.

Performance of male goats feed biological treated wheat straw

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Biological treatments for crop residues increase its protein and decrease CF contents consequently improve its nutritive value. Two experiments were conducted to evaluate effect of inclusion biological treated wheat straw in balanced diets (isonitrogenus isocaloric) on small ruminant performance. The first experiment was metabolic trials, which nine Ossimi rams were divided into 3 groups three animal each Three complete rations were formulated with commercial concentrate Feed mixture (CFM contain 16% CP and 63% TDN), Berseem hay, untreated wheat straw(UWS) and biological treated wheat straw(TWS). The first was control ration (T1) and contain UWS, hay and CFM. The treated wheat straw included in the second ration (T2) and the third ration (T3) to cover about 20 and 40% of total protein content of the ration. Biological treatmrnt of wheat straw with fungus increase protein and ash content and decrease OM, CF,NDF, ADF, hemicelluloses and cellulose content. Inclusion of treated wheat straw in the ration to cover 20 and 40% of the total protein has adverse effect on all nutrient digestibilities consequently the feeding value. pH value, NH3-N and total VFA's concentration as well as Acetic, propionic and butyric concentration and acetic :propionic ratio decreased ($P<0.05$) in the groups received treated wheat straw at different time. The same trend was observed for total rumen fungal and microbial protein concentration. And the second was feeding and growth experiment, which 30 male goats were divided into 3 groups 10 animal each. Inclusion TWS in the ration decrease ($P<0.05$) average daily gain, total gain and final weight in T3 compared to the control group and T2. DM, TDN and CP conversion was biter for T1 compared to the other groups. It could be concluded that using biologically treated wheat straw in animal ration can't improve animal performance and need to more studies.

Effect of stage of maturity at harvest and chop length on faecal particle size in dairy cows fed grass silage

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The particle size of faeces depends on the type of feed ingested, and may be indicative of good or poor rumen function. The objective of this study was to evaluate particle size distribution in faeces from dairy cows fed grass silage harvested at two stages of maturity and three chop lengths. The experimental design included ad libitum feeding with grass silage supplemented with 6 kg of concentrate to six lactating Norwegian Red dairy cows (27±9 DIM) during a three weeks period incorporating a 6×6 Latin square design with two stages of maturity and three physical forms of grass silage. The grass was harvested at an early (D-value 76%, 20% CP and 42% NDF per DM basis) or normal (D-value 70%, 15% CP and 52% NDF per DM basis) stage of maturity and fed unchopped (170 mm median particle length; MPL), medium chopped to 55 mm MPL or finely chopped to 24 mm MPL. Faeces were collected for 7 days, washed in nylon bags with a pore size of 10 µm and freeze dried before being sorted into six sieving fractions with square holes of 2.36 (O), 1.0 (M), 0.5 (S), 0.212 (D), 0.106 (C) mm and a bottom bowl (B). The faecal arithmetic mean particle size (APS), the geometric mean particle size (GPS), the most frequent particle size and median particle size values were significantly higher for normal stage of maturity at harvest ($P<0.001$). The APS and GPS values were significantly higher for finely chopped compared with unchopped silage ($P<0.05$). High frequencies of long faecal particles (>10 mm), which are indicative of poor rumen function due to lack of structural fibre, were not found for any of the rations. In conclusion, both the stage of crop maturity at harvest and its physical form when fed, affects particle size distribution in washed faeces from dairy cows to a high degree.